FOUNDATION: Key Stage 4 Maths Curriculum

Long Term Plan Year 9

Autumn 1
Chapter 1: Calculations
Assessment: Chapter Test A
Builds Upon: • Write numbers in words from figures and vice versa • Order integers, decimals and negative numbers • Round to nearest 10,100, 1000 • Round to decimal places • Add/Subtract numbers with decimals • Multiply/Divide positive and negative numbers • Multiply 2 digits and 3 digit numbers • Multiply numbers with decimals • Divide using the algorithm (by hand) • Divide decimal numbers using the algorithm Order of operations (BIDMAS)
Introduces: • Round to significant figures • Add/Subtract positive and negative numbers • Multiply/Divide positive and negative numbers • Manipulate of operations involving decimals (using one calculation to find the answer to another)

Autumn 2

Chapter 2: Expressions

Assessment: Chapter Test A

Builds Upon:

- Apply algebraic notation to write simple expressions
- Simplify expressions by collecting like terms (addition and subtraction)
- Substitute for variables in simple expressions

Introduces:

- Apply the Index laws (multiplication, division)
- Apply the Index laws (fractional, negative and zero)
- Expanding single brackets
- Factorise single brackets
- Simplifying algebraic fractions
  Add/Subtract algebraic fractions
- Multiplying algebraic fractions
- Divide algebraic fractions

Spring 1

Chapter 3: Angles and Polygons

Assessment: Chapter Test A

Builds Upon:

- Measure and describe angles as acute, right, obtuse or reflex

Introduces:

- Describe and apply the properties of angles around a point (sum of 360 degrees)
- Calculate bearings based on angles around a point
- Describe and apply the properties of angles on a straight line (sum of 180 degrees)
- Derive and apply the sum of angles in triangles and quadrilaterals
- Apply knowledge of special triangles to derive angles
- Describe and apply the equivalence of vertically opposite angles
- Identify and apply the properties of angles in parallel lines (alternate, corresponding and co-interior rules)
- Solve problems involving all of the above (providing reasons)
- Identify similarity between shapes
- Calculate and apply scale factors
- Identify and describe types of congruence (SSS, SAS, ASA, RHS)
- Apply similarity and congruence to problem solve
- Calculate and apply scale factors for area and volume from the linear scale factor
- Calculate interior angles in polygons (using angles in a triangle)
- Deduce and apply the sum of interior angles of any polygon and use (n-2)*180
- Calculate exterior angles in polygons
- Solve problems involving angles in polygons

Spring 2	
Chapter 4: Handling Data 1	**Chapter 5: Fractions, Decimals and Percentages**
Assessment: Chapter Test A	**Assessment:** Chapter Test A
Builds Upon: • Represent data in tally tables • Understand the link between tally and frequency tables • Read and interpret tally tables to solve problems • Construct and interpret pictograms • Construct and interpret bar charts • Calculate the mean, mode and median of listed data •	**Builds Upon:** • Name and construct fraction diagrams • Convert between improper fractions and mixed numbers • Identify and create equivalent fractions • Simplifying fractions • Write fractions as decimals • Order fractions and mixed numbers • Calculate fractions of amounts • Calculating percentages of amounts • Multiplying fractions, including simplifying (cancelling common factors) • Multiplying fractions and mixed numbers • Dividing fractions and mixed numbers • Adding and subtracting fractions with the same denominator • Adding and subtracting fractions with different denominators • Adding and subtracting mixed numbers • Solve worded fraction problems • Write percentages as fractions and decimals • Converting between fractions, decimals and percentages • Compare using < or > and order fractions, decimals and percentages
Introduces: • Represent data in two-way tables Interpret two way tables to solve problems • Construct and interpret pie charts • Calculate the mean, mode and median of data in a frequency table • Calculate the range of data in lists and frequency tables • Understand the advantages and disadvantages of different averages • Identify outliers and explain their effect on averages/ranges • Compare distributions using averages and range	**Introduces:** • Convert recurring decimals to fractions • Solving complex worded problems with a mixture of fractions, decimals and percentages

Summer 1
Chapter 6: Formulae & Functions
Assessment: Chapter Test A
Builds Upon: • Write formulae from sentences • Substitute to solve (positive and negative numbers) • Use standard formulae (e.g. kinematics) • Simplify expressions • Expand single brackets
Introduces: • Change the subject of formulae • Identify expressions, equations, inequalities, formulae and identities • Expand double brackets • Factorise quadratic expressions • Complete the difference of two squares • Distinguishing between, and factorise : $x^2 - 4$ and $x^2 - 4x$

Summer 2

Chapter 7: Working in 2D

Assessment: Chapter Test A

Builds Upon:

- Accurately measure and draw line segments and angles
- Bearings on a map
- Area of quadrilaterals (squares, rectangles, parallelograms, trapezium) and triangles
- Area of compound 2D shapes

Introduces:

- Apply scale to drawings -find distances on a map and in real life
- Sketching lines such as y = -2, y = x etc.
- Completing transformations:
    - Translation
    - Reflections
    - Rotations from origin and a point
    - Enlargements (greater than 1 & between 0 and 1)
    - Enlargements from a point
    - Combinations of Transformations
- Describing transformations

Year 10

Autumn 1	
Chapter 8: Probability	**Chapter 9: Estimation and Approximation**
Assessment: Chapter Test A	**Assessment:** Chapter Test A
Builds Upon: • Understand the probability scale • Construct sample space diagrams List sample space of an experiment • Write experimental and theoretical probabilities as fractions	**Builds Upon:** • Round to appropriate degree of accuracy (10,100,1000s, dps, sfs) • Use common calculator functions • Convert units of length, mass, volume, capacity, time and area
Introduces: • Write experimental and theoretical probabilities as relative frequencies • Calculate expected frequencies • Compare theoretical probabilities with experimental probabilities • Recognise mutually exclusive events and exhaustive events • Understand that the probabilities of mutually exclusive exhaustive events sum to one • Compare bias and equally likely events	**Introduces:** • Use approximation to make estimates • Check calculations using approximation and estimation • Estimate square roots • Calculate compound units of speed and density • Rearrange compound unit calculations to find missing values • Use inequality notation to state error intervals and interpret limits of accuracy

Autumn 2	
Chapter 10: Equations and Inequalities	**Chapter 11: Circles and Constructions**
Assessment **Chapter Test A**	**Assessment** **Chapter Test A**
Builds Upon: • Solve one step equations (using function machines) • Solve one step equations (using balancing method) • Solve two step equations (without brackets) • Solve two step equations (with brackets) • Solve two step equations (including negatives and improper fractions as solutions) • Solve equations with variables on both sides • Changing the subject of a Formula • Form and solve equations from worded questions • Form and solve equations with the unknown on both sides •	**Builds Upon:** • Calculate the perimeter of basic shapes (rectangles and triangles) • Calculate the area of basic shapes (rectangles and triangles) • Calculate circumference of circles • Calculate area of circles • Calculate perimeter and area of composite shapes involving halves and quarters of circles • Construct and measure lines (using rulers) • Construct a circle (using a compass) •
Introduces • Solve equations by reading off graphs (provide graphs if unable to plot) • Solving quadratic equations by reading off graphs (provide graphs if unable to plot) • Factorise quadratics • Solving quadratics without coeff of x^2 by factorising • Solving quadratics with coeff of x^2 by factorising • Solve simultaneous equations (using elimination) • Solve simultaneous equations (using substitution) • Form and solve simultaneous equations • Represent inequalities on number lines • Solve inequalities and representing solutions on a number line	**Introduces:** • Calculate arc length • Calculate area of sectors • Calculate perimeter and area of composite shapes involving sectors • Construct and measure angles (using protractors) • Construct a perpendicular line bisector • Construct a perpendicular at a point on a line • Construct a perpendicular to a line from a point • Construct an angle bisector • Construct a SAS triangle • Construct an ASA triangle • Construct a SSS triangle • Loci (from one point, two points (line), two lines) • Loci (a combination of one point, two points and two lines)

Spring 1

Chapter 12: Ratio & Proportion

Assessment
Chapter Test A

Builds Upon:

- Write fractions
- Convert fractions to decimals (using non calculator 10th, 100ths, 1000ths method)
- Convert fractions to decimals (using calculator method)
- Convert decimals to fractions (using non calculator 10th, 100ths, 1000ths method)
- Convert basic fractions to percentage (using number line)
  Convert percentages to fractions (using out of 100)
- Convert decimals to percentages (link to number line)
  Convert percentages to decimals (link to number line)
- Ordering fractions, decimals and percentages
- Calculate percentage of an amount (non calculator method)
- Calculate percentage of an amount (calculator/multiplier method)
- Reverse percentage (calculate fraction of an amount as a percentage)
- Calculate percentage increases and decreases
- Reverse percentage (calculate increase or decrease as a percentage)

Introduces:

- Write proportions as ratios
- Simplify proportion ratios
- Share using ratios (ADAM)
- Use ratio to solve proportion and scale factor problems
- Reasoning and problem solving

Spring 2	
Chapter 13: Factors, Powers and Roots	**Chapter 14: Graphs 1**
Assessment **Chapter Test A**	**Assessment** **Chapter Test A**
Builds Upon: • List primes • List multiplies • List factors • Identify primes, multiples and factors from a list • Identify HCF of two numbers • Identify LCM of two numbers • Solve worded LCM and HCF problems • Construct a prime factor tree (Prime factor decomposition) • Calculate positive integer powers and roots	**Builds Upon:** • Name and plot basic coordinates •
Introduces: • Identify HCF and LCM using product notation (Venn diagram method)	**Introduces:** • Substitute into y=mx+c to create a table of values • Plot tables of values to draw lines • Investigate and plot y=? and x=? lines • Investigate to observe the effect of positive and negative gradients Calculate gradient of lines (using rise ÷ run) • Investigate to observe the effect of changing c • Write linear equations from graphs • Write linear equations from worded problems • Interpret distance-time graphs • Construct distance-time graphs

Summer 1	
PPES	**Chapter 15: Working in 3D**
Assessment **2 x 90 min exams**	**Assessment** **Chapter Test A**
	Builds Upon: • Identify the numbers of faces, edges and vertices of 3D shapes • Construct nets of 3D shapes • Identify nets of 3D shapes • Calculate volume of cuboids and prisms • Calculate volume of cylinders
	Introduces: • Construct and interpret plan, front and side elevations of 3D shapes • Solve problems to find missing lengths given volume • Calculate surface area of cuboids • Calculate surface area of prisms • Calculate surface area of spheres, pyramids, cones and composite shapes • Solve problems to find missing lengths given surface area

Summer 2	
Chapter 16: Handling Data 2	**Chapter 17: Calculations 2**
Assessment **Chapter Test A**	**Assessment** **Chapter Test A**
Builds Upon: • Explain key data terms (discrete and continuous) • Interpret and construct group frequency/tally tables • Interpret and construct bar graphs for group discrete data	**Builds Upon**: • Calculate basic roots and indices • Apply index laws (multiplying, dividing and powers of a power) • Convert large numbers in and out of standard form • Convert small numbers in and out of standard form •
Introduces: • Interpret and construct histograms for group continuous data • Identify the estimated mean • Identify modal class • Identify the class interval in which the median lies • Use estimated mean, modal class, class interval and range to compare distributions • Construct scatter graphs • Describe scatter graph correlation • Draw lines of best fit on scatter graphs • Extrapolate predictions from scatter graphs using line of best fit • Interpret and construct line graphs for time series data • Calculate speed from distance-time graphs using gradient (contrast exact speed vs. average speed) • Calculate acceleration from distance-time graphs using speed)	**Introduces:** • Solve more complex index problems • Calculate exact solutions with fractions (addition, multiplication and division) • Calculate exact solutions with multiples of π • Solve standard form calculations (multiplication and division) • Solve worded standard form problems

Year 11

Autumn 1	
Chapter 18: Graphs 2	**Chapter 19: Pythagoras, Trigonometry and Vectors**
Assessment **Chapter Test A**	**Assessment** **Chapter Test A**
Builds Upon: • Plot linear graphs using tables of values • Plot and interpret real-life graphs	**Builds Upon:** • Apply the sum of angles rule in triangles
Introduces: • Plot quadratic functions • Identify and interpret roots, intercepts and turning points of quadratic functions • Solve quadratic equation by finding approximate solutions using graphs • Recognise, sketch and interpret graphs cubic functions • Recognise, sketch and interpret graphs reciprocal functions	**Introduces**: • Apply formulae for Pythagoras' theorem to find long sides Apply formulae for Pythagoras' theorem to find short sides • Apply trigonometric ratios (sin/cos/tan) to find lengths • Apply trigonometric ratios (sin/cos/tan) to find angles • Know the exact values of sinØ and cosØ for Ø= 0, 30,45,60,90 degrees • Know the exact value of tan Ø for Ø= 0,30,45,60 degrees • Write column vectors and draw vector diagrams • Add and subtract vectors • Calculate multiples of vectors using a scalar

Autumn 2	
PPES	**Chapter 20: Combined events**
Assessment **2x 90 min exams**	**Assessment** **Chapter Test A**
	Builds Upon: • Arrange sets into Venn diagrams
	Introduces: • Describe sets using Venn diagrams (intersection, union and complement) • Use Venn diagrams to record outcomes and calculate probabilities of events • Construct possibility (sample) space diagrams Calculate probabilities from sample space diagrams • Use tree diagrams to show the frequency or probabilities of two events • Use tree diagrams to calculate the probabilities of independent and dependent events • Calculate estimated outcomes using probabilities

Spring 1	
Chapter 21: Sequences	**Chapter 22: Units and Proportionality**
Assessment **Chapter Test A**	**Assessment** **Chapter Test A**
Builds Upon: • Write sequence using term to term rule • Write sequences using position to term rule (nth rule) • Write the position to term rule (nth rule) for a linear sequence • Recognise special types of sequence (square, cube, triangular, arithmetic, geometric, Fibonacci and quadratic)	**Builds Upon:** • Calculations using standard and compound units (speed, density and pressure)
Introduces: • Find terms of quadratic sequence using term to term or position to term rule	**Introduces**: • Compare lengths, areas, and volumes of similar shapes • Solve direct proportion problems • Interpret the gradient of a straight line graph as a rate of change • Solve inverse proportion problems • Interpret graphs that illustrate direct and inverse proportion • Set up, solve and interpret growth and decay problems **:**

Spring 2
PPEs and GCSE EXAM REVISION
Assessment **2x 90min exams**
Builds Upon:
Introduces:

Summer 1
GCSE EXAM REVISION
Assessment: **3 x 90 min official public exams**
Builds Upon:
Introduces:

Summer 2